THE FOLLOWING ARE THE ENGLISH TRANSLATION OF ANNEXES TO THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (ARTICLE 34):

2nd Amendment (Pages 4, 4a, 5, 5a, 51-56, and 56a)

circumstances into consideration, and provides a fuel cell and an oxidant distributing plate in which an active material in the distributing plate flows from the opposite passage to the reaction passage having the front-rear relation to the opposite passage.

【0011】 A fuel cell of the present invention comprises (i) a membrane-electrode assembly including an electrolyte membrane having an ion-conducting property, an oxidant pole disposed at one side of the electrolyte membrane in a thickness direction thereof, and a fuel pole disposed at other side of the electrolyte membrane in the thickness direction thereof, (ii) an oxidant distributing plate disposed facing to the oxidant pole for supplying an oxidant gas to the oxidant pole, and (iii) a fuel distributing plate disposed facing to the fuel pole for supplying a fuel to the fuel pole.

【0012】 The fuel cell is characterized by that at least one of the oxidant distributing plate and the fuel distributing plate is provided with (a) an opposite passage formed on an opposite surface which is opposite to the membrane-electrode assembly, (b) a reaction passage which is formed on a facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows an oxidant gas or a fuel having flowed in the opposite passage to flow in the reaction passage, and (c) an end portion of the opposite passage which is communicated with a start portion of the reaction passage.

【0013】 An oxidant distributing plate for a fuel cell of the present invention is disposed facing to an oxidant pole of a membrane -electrode assembly of a fuel cell for supplying an oxidant gas to the oxidant pole. The oxidant distributing plate is characterized by (a) an opposite passage which is formed on an opposite surface which is opposite to the membrane-electrode assembly and in which the oxidant gas flows, (b) a reaction passage which is formed on a

facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows

the oxidant gas having flowed in the opposite gas to flow in the reaction passage, and (c) an end portion of the opposite passage which is communicated with a start portion of the reaction passage.

【0014】 At least one of the oxidant distributing plate and the fuel distributing plate of the fuel cell of the present invention, and the oxidant distributing plate of the present invention, include (a) an opposite passage formed on an opposite surface which is opposite to the membrane-electrode assembly, and (b) a reaction passage which is formed on a facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows an oxidant gas or a fuel having flowed in the opposite passage to flow in the reaction passage.

【0015】 Here, the opposite passage is formed on one surface, and the reaction passage is formed on other surface having a front-rear relation to the opposite passage, of the distributing plate, respectively. An end portion of the opposite passage is communicated with a start portion of the reaction passage. The oxidant gas or the fuel, after having flowed in the opposite passage of the distributing plate, flows in the reaction passage thereof. The present invention can provide the fuel cell and the oxidant distributing plate which have such front-rear relation passage system.

【0016】 According to the present invention, the oxidant gas and/or the fuel before a reaction are/is humidified in the opposite passage of the distributing plate formed on the opposite surface opposite to the MEA, by utilizing the water generated in the fuel cell. Thus, "internal self humidifying construction" can be realized. In this way, the humidifying apparatus for humidifying the oxidant gas and/or the fuel before supplied to the fuel cell, can be simplified or excluded.

【0017】 Especially, when the oxidant distributing plate is porous, the water created in the oxidant pole during the power generation can be effectively used. That is, a water component or a moisture, based

CLAIMS

1. (amended) A fuel cell, comprising:

a membrane-electrode assembly including an electrolyte membrane having an ion-conducting property, an oxidant pole disposed at one side of the electrolyte membrane in a thickness direction thereof, and a fuel pole disposed at other side of the electrolyte membrane in the thickness direction thereof;

an oxidant distributing plate disposed facing to the oxidant pole for supplying an oxidant gas to the oxidant pole; and

a fuel distributing plate disposed facing to the fuel pole for supplying a fuel to the fuel pole,

characterized by that:

at least one of the oxidant distributing plate and the fuel distributing plate is provided with (a) an opposite passage formed on an opposite surface which is opposite to the membrane-electrode assembly, (b) a reaction passage which is formed on a facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows the oxidant gas or the fuel having flowed in the opposite passage to flow in the reaction passage, and (c) an end portion of the opposite passage which is communicated with a start portion of the reaction passage.

2. A fuel cell according to claim 1, wherein for at least one of the oxidant distributing plate and the fuel distributing plate, a humidifying element for humidifying the oxidant gas or the fuel flowing in the opposite passage in the fuel cell is provided.

3. (amended) A fuel cell according to claim 2, wherein the humidifying element is formed by making a part of the oxidant distributing plate and/or the fuel distributing plate porous to have

a transmitting property in a thickness direction thereof.

4. (amended) A fuel cell, comprising:

a membrane-electrode assembly including an electrolyte membrane having an ion-conducting property, an oxidant pole disposed at one side of the electrolyte membrane in a thickness direction thereof, and a fuel pole disposed at other side of the electrolyte membrane in the thickness direction thereof;

an oxidant distributing plate disposed facing to the oxidant pole for supplying an oxidant gas to the oxidant pole; and

a fuel distributing plate disposed facing to the fuel pole for supplying a fuel to the fuel pole,

characterized by that:

at least one of the oxidant distributing plate and the fuel distributing plate is provided with (a) an opposite passage formed on an opposite surface which is opposite to the membrane-electrode assembly, (b) a reaction passage which is formed on a facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows the oxidant gas or the fuel having flowed in the opposite passage to flow in the reaction passage, (c) a porous portion for communicating at least a part of the opposite passage with at least a part of the reaction passage, and (d) an end portion of the opposite passage which is communicated with a start portion of the reaction passage,

wherein an active material contained in the oxidant gas or an active material contained in the fuel flowing in the opposite passage is supplied to the reaction passage via pores of the porous portion.

5. A fuel cell according to claim 4, wherein the part of the oxidant

distributing plate and/or the part of the fuel distributing plate are/is a downstream area of the reaction passage.

6. (amended) A fuel cell according to one of claims 2 to 5, further including a refrigerant distributing plate disposed at opposite side which is opposite to the membrane-electrode assembly with respect to the oxidant distributing plate and/or the fuel distributing plate for allowing a refrigerant to flow,

wherein the humidifying element is formed by making the refrigerant distributing plate porous to have a transmitting property in a thickness direction thereof, so that the refrigerant flowing in the refrigerant distributing plate is supplied to the opposite passage of the oxidant distributing plate and/or the fuel distributing plate.

7. A fuel cell according to one of claims 1 to 6, wherein a downstream area of the opposite passage and an upstream area of the reaction passage of the oxidant distributing plate, are formed on the oxidant distributing plate by a front-rear relation.

8. A fuel cell according to one of claims 1 to 7, wherein the oxidant distributing plate and/or the fuel distributing plate have/has a hydrophilic property.

9. A fuel cell according to one of claims 1 to 7, wherein the oxidant distributing plate and/or the fuel distributing plate have/has a hydrophobic property.

10. A fuel cell according to one of claims 1 to 9, wherein a pore rate of the oxidant distributing plate is selected relatively larger at a

downstream area than at an upstream area, of the reaction passage.

11. A fuel cell according to claim one of claims 1 to 10, wherein a pore diameter of the oxidant distributing plate is selected substantially constant from a downstream area to an upstream area, of the reaction passage.

12. A fuel cell according to claim one of claims 1 to 10, wherein a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream area than at an upstream area, of the reaction passage.

13. A fuel cell according to claim one of claims 1 to 10, wherein the oxidant distributing plate has a hydrophilic property, and a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream area than at an upstream area, of the reaction passage.

14. A fuel cell according to claim one of claims 1 to 10, wherein the oxidant distributing plate has a hydrophobic property, and a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream area than at an upstream area, of the reaction passage.

15. A fuel cell according to claim one of claims 1 to 10, wherein a pore diameter of the oxidant distributing plate is selected relatively larger at a downstream area than at an upstream area, of the reaction passage.

16. A fuel cell according to claim one of claims 1 to 10, wherein

the oxidant distributing plate has a hydrophobic property, and a pore diameter of the oxidant distributing plate is selected relatively larger at a downstream area than at an upstream area, of the reaction.

17. (amended) An oxidant distributing plate for a fuel cell to be disposed facing to an oxidant pole of a membrane-electrode assembly of the fuel cell for supplying an oxidant gas to the oxidant pole,

characterized by:

an opposite passage which is formed on an opposite surface opposite to the membrane-electrode assembly and in which the oxidant gas flows;

a reaction passage which is formed on a facing surface which faces to the membrane-electrode assembly, which is communicated with the opposite passage, and which allows the oxidant gas having flowed in the opposite passage to flow in the reaction passage; and

an end portion of the opposite passage which is communicated with a start portion of the reaction passage.

18. An oxidant distributing plate for a fuel cell according to claim 17, wherein at least a downstream area of the reaction passage of the oxidant distributing plate is made porous.

19. An oxidant distributing plate for a fuel cell according to claim 17 or 18, wherein a pore rate of the oxidant distributing plate is selected relatively larger at a downstream area than at an upstream area, of the reaction passage.

20. An oxidant distributing plate for a fuel cell according to one of claims 17 to 19, wherein a pore diameter of the oxidant

distributing plate is selected substantially constant from a downstream area to an upstream area, of the reaction passage.

21. An oxidant distributing plate for a fuel cell according to one of claims 17 to 19, wherein a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream area than at an upstream area, of the reaction passage.

22. An oxidant distributing plate for a fuel cell according to one of claims 17 to 19, wherein the oxidant distributing plate has a hydrophilic property, and a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream than at an upstream area, of the reaction passage.

23. An oxidant distributing plate according to one of claims 17 to 19, wherein the oxidant distributing plate has a hydrophobic property, and a pore diameter of the oxidant distributing plate is selected relatively smaller at a downstream area than at an upstream area, of the reaction passage.

24. An oxidant distributing plate according to one of claims 17 to 19, wherein a pore diameter of the oxidant distributing plate is selected relatively larger at a downstream area than at an upstream area, of the reaction passage.

25. An oxidant distributing plate according to one of claims 17 to 19, wherein the oxidant distributing plate has a hydrophobic property, and a pore diameter of the oxidant distributing plate is selected relatively larger at a downstream area than at an upstream area, of the reaction passage.

26. (deleted)

27. (deleted)

28. (deleted)

29. (amended) A fuel cell according to claim 1, wherein one of the oxidant distributing plate and the fuel plate is formed by a densified member.